SCIENTIFIC LETTER

Prognostic impact of new onset atrial fibrillation in acute non-ST elevation myocardial infarction data from the RICO survey

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New onset atrial fibrillation (AF) is a common complication of acute myocardial infarction (MI), with a prevalence ranging of from 7–18%, and is associated with a higher incidence of in-hospital congestive heart failure. AF occurs in patients who are older with severe coronary artery disease and is associated with higher 30 day and one year mortality rates than for those patients without AF.[1–4]

However, most studies have been performed on data collected from patients with ST elevation myocardial infarction (STEMI). In the present study, we examined the characteristics and in-hospital outcome for a non-selected population, hospitalised for non-ST elevation myocardial infarction (NSTEMI) and included in the French regional RICO survey.

METHODS

From 1 January 2001 to 31 July 2003 pre-hospital as well as in-hospital data from 504 patients, hospitalised for acute NSTEMI in one region of eastern France, were analysed. All the cardiology departments of the region, five public hospitals and one private clinic, in charge of cardiac emergencies, participated in the study.

All patients included in the study presented with NSTEMI. The diagnoses were based on: an increase in troponin concentrations to the upper limit of normal (ULN) or creatine kinase myocardial band $\geqslant 2$ ULN; NSTEMI (ST segment depression or negative T wave on ECG); patients admitted to index hospital within 24 hours following symptom onset. Patients presenting any one of the following criteria were excluded from the study: persistent ST elevation or new Q waves on ECG; unconfirmed MI diagnosis on behalf of another diagnosis (pulmonary embolism, aortic dissection, acute pericarditis); post-percutaneous transluminal coronary angioplasty MI or post-coronary artery bypass graft MI; delay from symptom onset to presentation > 24 hours; permanent AF before admission.

Data collection was prospective, uniform, and standardised in all centres. Medical data for each patient were collected from the moment the mobile emergency unit took charge of the patient (time zero) to discharge. Demographic data and cardiovascular risk factors were collected from time zero; clinical data at hospital admission, the main therapeutic agents administered during the first 48 hours, and the main cardiac events during hospitalisation (from time zero to discharge) were also recorded. Left ventricular ejection fraction (LVEF) was evaluated for 372 (74%) patients either by contrast or radionuclide ventriculography or echocardiocardiography.

New onset AF was defined when AF developed < 24 hours after MI onset. According to recent guidelines,[5] ECGs were monitored for the occurrence of AF or ventricular arrhythmias including ventricular tachycardias (recording of more than three ventricular ectopic beats) and ventricular fibrillations, for three days after admission. Holter electrographic tracings were collected for 24 hours before discharge.

Two groups of patients were compared: the AF group included patients who developed AF < 24 hours after MI onset, and the sinus rhythm (SR) group included all other patients with SR. Results were expressed as median time (25th–75th centile). Qualitative data were compared using a χ^2 test modified by Yates. Quantitative parameters were compared by the Student unpaired t test. A multiple logistic regression model was chosen to assess the relation between variables and the occurrence of events. Model building involved selecting the variables that were prognostic for adverse hospital outcome in multiple regression analyses. The first model was built with variables that are known predictors of AF and that were predictors in univariate analysis (age, Killip class > 2, chronic obstructive pulmonary disease (COPD), smoking, and hypertension). The second model tested AF after adjustment for potential confounding factor (age, Killip class > 2, cardiogenic shock, and LVEF) as a predictor for death or ventricular arrhythmia. Age and LVEF has been dichotomised according to classical data from the literature (age > 75 years and LVEF < 45%). The significance level required to be entered in multivariate analysis was 10%. The Wald test was performed to test for significance. Results are expressed as odds ratio (OR) with 95% confidence intervals (CI). All tests were two sided. Differences were significant at the 5% level (p < 0.05).

RESULTS

Of the 504 NSTEMI patients included in the study, 39 (7.6%) were in the AF group and 465 (92.4%) were in the SR group.

Age was higher in the AF versus the SR group (77 (73–83) years old *v* 70 (56–79) years old, respectively, p < 0.001). The sex ratio was similar for the two groups. On admission, the percentage of patients with clinical heart failure (Killip > 2) was higher in the AF group compared to the SR group (36% *v* 18% respectively, p = 0.014).

With regard to mean heart rate before AF onset, patients with AF had increased heart rate on admission (97 (85–130) bpm *v* 76 (65–90) bpm, p = 0.0003). No differences were observed between the two groups for primary revascularisation procedures.

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Abbreviations: AF, atrial fibrillation; COPD, chronic obstructive pulmonary disease; GUSTO-I, global use of streptokinase and t-PA for occluded coronary arteries; LVEF, left ventricular ejection fraction; MI, myocardial infarction; NSTEMI, non-ST elevation myocardial infarction; SR, sinus rhythm; STEMI, ST elevation myocardial infarction; ULN, upper limit of normal

Table 1 Cardiovascular events, mortality rate, and duration of in-hospital stay

	SR group (n = 465)	AF group (n = 39)	p Value
Death	29 (6%)	8 (21%)	0.003
Death or VT/VF	48 (10%)	11 (28%)	<0.001
VT/VF	27 (6%)	4 (10%)	0.445
Cardiogenic shock	33 (7%)	6 (15%)	0.121
MI recurrence	53 (11%)	7 (18%)	0.339
Duration of stay (days)	4 (3–6)	4 (3–7)	0.696

Data are presented as percentages or median (25th–75th centile). MI, myocardial infarction; VF, ventricular fibrillation; VT, ventricular tachycardia.

In a multivariate model, when adjusting for age > 75 years, Killip class > 2, COPD, not smoking, and hypertension, only age remained associated with the occurrence of AF (p = 0.038).

In-hospital mortality and the combined criterion (in-hospital mortality or ventricular tachycardia/ventricular fibrillation) was higher in the AF group than in the SR group (21% and 28% in the AF group v 6% and 10% in the SR group, p = 0.003 and p < 0.001, respectively) (table 1).

After adjustment for significant predictors of mortality (age, Killip class > 2, cardiogenic shock, and LVEF < 45%), AF remained an independent predictor for cardiac death or ventricular arrhythmia (OR = 2.23; p < 0.001).

DISCUSSION

The main findings of this study are: firstly, AF occurred in 7.7% of an unselected NSTEMI population; secondly, an age of > 75 years is strongly associated with a risk of AF in this population; thirdly, AF is an independent predictor for cardiac death and/or ventricular arrhythmia in patients with NSTEMI.

Higher Killip class at admission, observed in the AF group, suggests that haemodynamic compromise is the most likely mechanism of this rhythm disturbance, as described in previous studies including STEMI patients.[3] The occurrence of congestive heart failure was significantly higher in the AF group than in the SR group. This finding may be because of acute worsening of cardiac haemodynamic variables from the loss of atrial contraction.

In the present study, the mortality rate in NSTEMI patients with AF was higher than that reported in the GUSTO-I experience (21% v 13.8%, respectively).[2] This finding is partly explained by the differences in therapeutic management (reperfusion strategy) between the two series—all STEMI patients enrolled in GUSTO-I were thrombolytic eligible, while only 11% benefited from a percutaneous coronary intervention in our study, as recommended for patients judged to be at high risk for MI or death.[5] In addition, in the NSTEMI population, the occurrence of AF seems to be associated with a worse in-hospital prognosis than in the STEMI population.

In summary, this is the first study that has examined the incidence and prognostic implications of AF in NSTEMI patients. AF is not an infrequent event during NSTEMI and is an independent predictor for cardiac death or ventricular arrhythmia in these patients.

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CORRECTION

G G L Biondi-Zoccai, A Abbate, R Bussani, et al. Reduced post-infarction myocardial apoptosis in women: a clue to their different clinical course? Heart 2005;**91**:99–101.

The following authors names were misspelt in the credits to this article: M-P Di Marino (not M-P D Marino), F De Giorgio (not F D Giorgio), and A Abbate (not A Abate).